**Goal:** In this lab, you will make a MySQL database and create a table in that database. Then you'll add data to the table and query it.

**Main task**

1. Run the lab environment and open a terminal
2. Run mysql as the administrative user
3. Create a new database called **Astronomy**
4. Switch to the new database
5. Create a new table called **Planets** with columns for **PlanetName**, **DayLength** and **YearLength**
6. Add data from the table below
7. Query the table to find planets with a day length longer than 24 hours. How many results do you get?
8. Query the table to find planets with a year length longer than 400 days. How many results do you get?

| **PlanetName** | **DayLength** | **YearLength** |
| --- | --- | --- |
| Mercury | 4223 | 88 |
| Venus | 2802 | 225 |
| Earth | 24 | 365 |
| Mars | 25 | 687 |
| Jupiter | 10 | 4331 |
| Saturn | 11 | 10747 |
| Uranus | 17 | 30589 |
| Neptune | 16 | 59800 |

**Additional task**

1. Create a new table called **Moons** with columns for **PlanetName**, **MoonName** and **HasLiquidWater**
2. Add some data from the table below
3. How would you find moons with liquid water that orbit planets with a day length of less than 11 hours? Use **Moons.PlanetName = Planets.PlanetName** in your **WHERE** clause and **Moons, Planets** in your **FROM** clause to connect the two tables.
4. What are the options for a suitable data type for representing **HasLiquidWater**? Which would you choose?

| **PlanetName** | **MoonName** | **HasLiquidWater** |
| --- | --- | --- |
| Earth | Moon | No |
| Mars | Phobos | No |
| Jupiter | Europa | Yes |
| Saturn | Titan | No |
| Saturn | Enceladus | Yes |
| Uranus | Oberon | No |

**Useful commands**

Anything called 'list' below should have commas between entries

* **CREATE DATABASE** <databaseName>**;**
* **USE** <databaseName>**;**
* **CREATE TABLE** <tableName> **(**<fieldList> [, <primaryKeySpec>]**);**
* **SELECT** <fieldList> **FROM** <tableList> **WHERE** <criteria>**;**
* **INSERT INTO** <tableName> **VALUES (**<dataList>**)**;

**Solutions: Main Task**

Only look into this section if you're stuck

1. [open a terminal]
2. **mysql -u root**
3. **CREATE DATABASE Planets;**
4. **USE Planets;**
5. **CREATE TABLE Planets (PlanetName CHAR(8), DayLength INT,YearLength INT, PRIMARY KEY (PlanetName));**
6. **INSERT INTO Planets VALUES ('Mercury', 4223, 88), ('Venus', 2802, 225),** <...etc>**;**
7. **SELECT PlanetName FROM Planets WHERE DayLength > 24;**
8. **SELECT PlanetName FROM Planets WHERE YearLength >400;**

**Solutions: Additional Task**

Only look into this section if you're stuck

1. **CREATE TABLE Moons (PlanetName CHAR(8),** **MoonName CHAR(8), HasLiquidWater CHAR(6), PRIMARY KEY (MoonName));**
2. **INSERT INTO Moons VALUES ('Earth', 'Moon', 'No'), ('Mars', 'Phobos', 'No'),** <...etc>**;**
3. **SELECT 'MoonName' FROM Moons, Planets WHERE Moon.PlanetName=Planet.PlanetName AND HasLiquidWater='Yes' AND DayLength < 11;**
4. You can use Strings (as above) or Boolean values (in MySQL, a single binary bit). In SQL, you can also assign a NULL value to either of these where the answer is unknown.
5. **create database Astronomy;**
6. **use Astronomy;**

**Main Tasks**

1. **CREATE TABLE Planets(PlanetName varchar(255), DayLength int UNSIGNED, YearLength int UNSIGNED, PRIMARY KEY(PlanetName));**
2. **INSERT INTO Planets VALUES("Mercury",4223,88),("Venus",2802,225),("Earth",24,365),("Mars",25,687),("Jupiter",10,4431),("Saturn",11,10747),("Uranus",17,30589),("Neptune",16,59800);**
3. **SELECT \* FROM Planets WHERE DayLength>24**; to get all the rows with more than 24 hour or **SELECT count(\*) FROM Planets WHERE DayLength>24;** to get the number of rows
4. **SELECT \* FROM Planets WHERE YearLength>400;** to get the rows with more than 400 day per year or **SELECT count(\*) FROM Planets WHERE YearLength>400;** to get the number of rows

**Additional task**

1. **CREATE TABLE Moons(PlanetName varchar(255), MoonName varchar(255), HasLiquidWater varchar(255), PRIMARY KEY(MoonName));**
2. **INSERT INTO Moons VALUES("Earth","Moon","No"),("Mars","Phobos","No"),("Jupiter","Europa","Yes"),("Saturn","Titan","No"),("Saturn","Enceladus","Yes"),("Uranus","Oberon","No");**
3. **SELECT \* FROM Moons WHERE HasLiquidWater="Yes" AND Moons.PlanetName IN (SELECT PlanetName from Planets WHERE DayLength<11);** or **SELECT \* FROM Moons INNER JOIN Planets on Planets.PlanetName=Moons.PlanetName WHERE Moons.HasLiquidWater="Yes" AND Planets.DayLength<11;** or **SELECT \* FROM Moons LEFT JOIN Planets on Planets.PlanetName=Moons.PlanetName WHERE Moons.HasLiquidWater="Yes" AND Planets.DayLength<11;**
4. Suitable data type for representing HasLiquidWaterwould be Boolean or tinyint. I would choose tinyint and since Boolean in mysql will be converted to tinyint automatically.